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IS 3934 (1989): Aluminium Plug Type Spindles for Spinning and Doubling Frames [TXD 14: Machinery for Fabric Manufacture]



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Indian Standard

**ALUMINIUM PLUG TYPE SPINDLES
FOR SPINNING AND DOUBLING
FRAMES — SPECIFICATION**

(Second Revision)

भारतीय मानक

कताई और डब्लिंग फ्रेमों के एलुमिनियम के प्लगनुमा स्पिंडल — विशिष्ट
(दूसरा पुनरीक्षण)

UDC 677·052·932

**DESCRIPTORS : TEXTILE MACHINERY. SPINDLES — ALUMINIUM PLUG TYPE.
SPINNING AND DOUBLING FRAMES.**

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards on 31 January 1989, after the draft finalized by the Spinning Preparatory, Spinning and Doubling (Twisting) Machinery Sectional Committee had been approved by the Textile Division Council.

This standard has been revised to modify the requirements of hardness and trueness. The standard now covers recommended dimensions of spindles of various tapers for length up to 300 mm.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

ALUMINIUM PLUG TYPE SPINDLES FOR SPINNING AND DOUBLING FRAMES — SPECIFICATION

(*Second Revision*)

1 SCOPE

This standard prescribes the requirements for aluminium plug type spindles, spring grip type having following tapers suitable for use with warp tubes conforming to IS 3625 (Part 1) : 1983 'Specification for warp tubes for ring spinning and doubling spindles: Part 1 General (*second revision*)':

- a) 1 : 40 taper spindles,
- b) 1 : 64 taper spindles, and
- c) 1 : 38 taper spindles.

2 REFERENCES

The Indian Standards listed below are necessary adjuncts to this standard:

IS No.	Title
IS 210 : 1978	Specification for grey iron castings (<i>third revision</i>)
IS 733 : 1983	Specification for wrought aluminium and aluminium alloy bars, rods and sections (for general engineering purposes) (<i>third revision</i>)
IS 1570 (Part 4) : 1988	Schedules for wrought steels: Part 4 Alloy steels
IS 1586 : 1968	Methods for Rockwell hardness test (B and C scales) for steel (<i>first revision</i>)
IS 2500 (Part 1) : 1973	Sampling inspection tables: Part 1 Inspection by attributes and by count of defects (<i>first revision</i>)
IS 4431 : 1978	Specification for carbon and carbon-manganese free-cutting steel (<i>first revision</i>)

3 NOMENCLATURE

For the purpose of this standard, the nomenclature as indicated in Fig. 1 shall apply.

4 MANUFACTURE

4.1 Material

For the manufacture of components of spindles, suitable materials shall be chosen so as to meet the requirements specified.

NOTE — For choosing the materials, reference may be made to the following Indian Standards:

Component	Material	Reference to
Plug	Aluminium	IS 733 : 1983
Blade	Chrome alloy steel	IS 1570 (Part 4) : 1988
Wharve	Free cutting steel or Grey cast iron	IS 4431 : 1978 Grade 25 of IS 210 : 1978

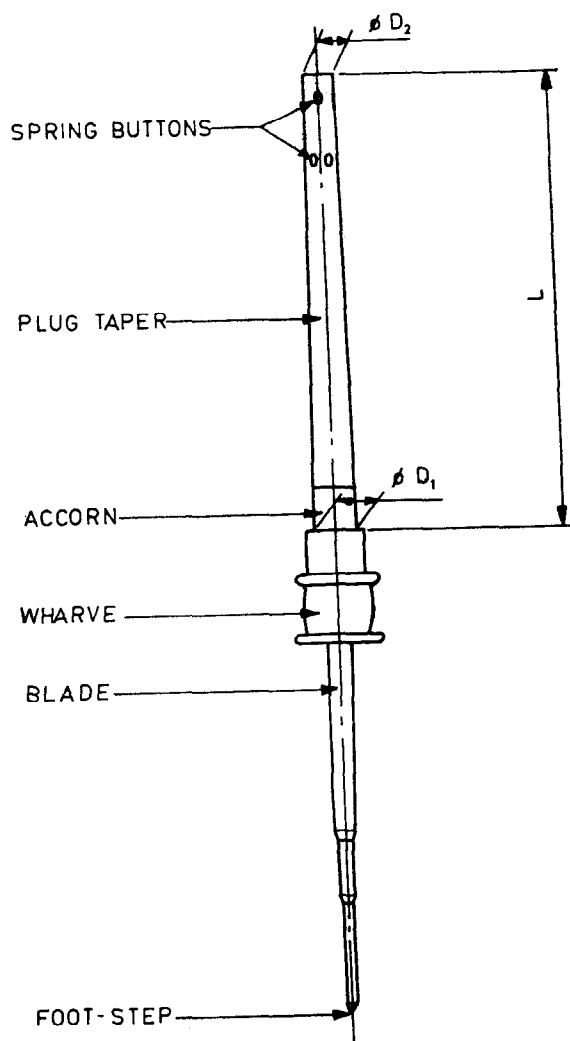


FIG. 1 TYPICAL ALUMINIUM PLUG SPINDLE
WITH SPRING BUTTONS

4.2 Workmanship and Finish

The spindles shall be free from scratches, scars, cracks, pit marks, traces of rust, burrs and any other surface defect. The spindle blade shall have perfect smooth ground finish with roughness not exceeding $1\text{ }\mu\text{m}$ except the bearing portion where it shall be not more than $0.5\text{ }\mu\text{m}$.

5 REQUIREMENTS

5.1 Dimensions

The recommended dimensions of spindles are given

in Tables 1, 2 and 3 when read with Fig. 1. The top and bottom diameter of plug shall be subject to a tolerance of -0.05 mm at top and -0.10 mm at bottom.

NOTE — In case spindles with different dimensions are manufactured for specific requirements of a buyer, the tolerance specified for top and bottom diameter of plug shall, however, apply.

5.1.1 The wharve diameter shall be subject to a tolerance of $\pm 0.1\text{ mm}$ and $\pm 0.2\text{ mm}$ for pulley made of steel and cast iron respectively.

Table 1 Dimensions for Aluminium Plug Type Spindles, Taper 1 : 40
(Clause 5.1, and Fig. 1)

All dimensions in millimetres.

Nominal Length <i>L</i>	Series 0		Series 1		Series 2		Series 3	
	<i>D</i> ₁	<i>D</i> ₂	<i>D</i> ₁	<i>D</i> ₂	<i>D</i> ₁	<i>D</i> ₂	<i>D</i> ₁	<i>D</i> ₂
(170)	—	—	17.0	12.75	16.00	11.75	15.00	10.75
180	—	—	18.50	14.00	17.00	12.50	16.00	11.50
(190)	—	—	18.50	13.75	17.00	12.25	16.00	11.25
200	22.00	17.00	20.00	15.00	18.50	13.50	17.00	12.00
(210)	22.00	16.75	20.00	14.75	18.50	13.25	17.00	11.75
220	24.00	18.50	22.00	16.50	20.00	14.50	18.50	13.00
(230)	24.00	18.25	22.00	16.25	20.00	14.25	18.50	12.75
240	27.00	21.00	24.00	18.00	22.00	16.00	20.00	14.00
(250)	27.00	20.75	24.00	17.75	22.00	15.75	20.00	13.75
260	30.00	23.50	27.00	20.50	24.00	17.50	22.00	15.50
(270)	30.00	23.25	27.00	20.25	24.00	17.25	22.00	15.25
280	33.00	26.00	30.00	23.00	27.00	20.00	24.00	17.00
(290)	33.00	25.75	30.00	22.75	27.00	19.75	24.00	16.75
300	36.00	28.50	33.00	25.50	30.00	22.50	27.50	19.50

NOTES

- 1 The values in brackets should be avoided wherever possible.
- 2 The values in the area framed are preferred.
- 3 The spindles with dimensions specified under Series 0 are generally suitable for use with ring diameter of 45 to 51 mm, Series 1 with 42 mm, Series 2 with 38 mm and Series 3 with 32 mm ring diameter.
- 4 The values of *D*₁ are an integer as per ISO practice.

Table 2 Dimensions for Aluminium Plug Type Spindles, Taper 1 : 64

(Clause 5.1, and Fig. 1)

All dimensions in millimetres.

Nominal Length <i>L</i>	Series 0		Series 1		Series 2		Series 3	
	<i>D</i> ₁	<i>D</i> ₂	<i>D</i> ₁	<i>D</i> ₂	<i>D</i> ₁	<i>D</i> ₂	<i>D</i> ₁	<i>D</i> ₂
(170)	—	—	17·00	14·34	16·00	13·34	15·00	12·34
180	—	—	18·50	15·69	17·00	14·18	16·00	13·18
(190)	—	—	18·50	15·69	17·00	14·18	16·00	13·18
200	22·00	18·88	20·00	16·88	18·50	15·38	17·00	13·88
(210)	22·00	18·88	20·00	16·88	18·50	15·38	17·00	13·88
220	24·00	20·56	22·00	18·56	20·00	16·56	18·00	14·56
(230)	24·00	20·41	22·00	18·41	20·00	16·41	18·00	14·41
240	27·00	23·25	24·00	20·25	22·00	18·25	20·00	16·25
(250)	27·00	23·09	24·00	20·09	22·00	18·09	20·00	16·09
260	30·00	25·94	27·00	22·94	24·00	19·94	22·00	17·94
(270)	30·00	25·78	27·00	22·78	24·00	19·78	22·00	17·78
280	33·00	28·62	30·00	25·62	27·00	22·62	24·00	19·62
(290)	33·00	28·47	30·00	25·47	27·00	22·47	24·00	19·47
300	36·00	31·31	33·00	28·31	30·00	25·31	27·00	22·31

NOTES

- 1 The values in brackets should be avoided wherever possible.
- 2 The values in the area framed are preferred.
- 3 The spindles with dimensions specified under Series 0 are generally suitable for use with ring diameter of 45 to 51 mm, Series 1 with 42 mm, Series 2 with 38 mm and Series 3 with 32 mm ring diameter.
- 4 The values of *D*₁ are an integer as per ISO practice.

5.2 Trueness of Spindles

The spindles shall meet the requirements given below for trueness:

Take a spindle from the test sample. Mount the spindle rigidly at a slight inclination in two bearings, one positioned directly below the wharve and the other at the foot-step (see Fig. 2). Set four dial-gauges one each at the position indicated in the figure. Rotate by hand, the upper position of the plug through one complete revolution and read the run-out from the gauges. If none of the readings exceeds maximum permissible run-out as given in the following table, the spindle shall be considered true.

Position**Maximum
Permissible
Run-Out**

- | | |
|---|---------|
| 1) 5 to 10 mm from top but above buttons | 0·05 mm |
| 2) Approximately 10 mm above the tube seating | 0·05 mm |
| 3) Centre of wharve | 0·05 mm |
| 4) 5 mm above the tip | 0·01 mm |

5.3 Hardness of Blade

The hardness of blade as measured on 'C' scale of Rockwell hardness tester according to the method prescribed in IS 1586 : 1968 shall be as follows:

- | | |
|-------------------------|--------------|
| a) 5 mm from bottom tip | 58 to 64 HRC |
| b) Bearing portion | 56 to 62 HRC |

Table 3 Dimensions for Aluminium Plug Type Spindles, Taper 1 : 38
(Clause 5.1, and Fig. 1)

All dimensions in millimetres.

Nominal Length L	Series 0		Series 1		Series 2		Series 3	
	D_1	D_2	D_1	D_2	D_1	D_2	D_1	D_2
(170)	—	—	17.00	12.53	16.00	11.53	15.00	10.53
180	—	—	18.50	13.76	17.00	12.26	16.00	11.26
(190)	—	—	18.50	13.76	17.00	12.26	16.00	11.26
200	22.26	17.00	20.26	15.00	18.76	13.50	17.00	11.74
(210)	22.27	16.75	20.27	14.75	18.77	13.25	17.00	11.48
220	24.28	18.50	22.28	16.50	20.28	14.50	18.78	13.00
(230)	24.30	18.25	22.30	16.25	20.30	14.25	18.80	12.75
240	27.31	21.00	24.31	18.00	22.31	16.00	20.31	14.00
(250)	27.32	20.75	24.32	17.75	22.32	15.75	20.32	13.75
260	30.34	23.50	27.34	20.50	24.34	17.50	22.34	15.50
(270)	30.35	23.25	27.35	20.25	24.35	17.25	22.35	15.25
280	33.36	26.00	30.36	23.00	27.36	20.00	24.36	17.00
(290)	33.37	25.75	30.37	22.75	27.37	19.75	24.37	16.75
300	36.39	28.50	33.39	25.50	30.39	22.50	27.39	19.50

NOTES

- 1 The values in brackets should be avoided wherever possible.
- 2 The values in the area framed are preferred.
- 3 The spindles with dimensions specified under Series 0 are generally suitable for use with ring diameter of 45 to 51 mm, Series 1 with 42 mm, Series 2 with 38 mm and Series 3 with 32 mm ring diameter.

5.4 Buttons

The plug shall be provided with buttons with projection of 0.7 ± 0.2 mm which should get flushed in level with the surface of the plug.

6 PACKING

Each spindle shall be coated with a rust-preventive material. The spindles shall be packed in suitable boxes strong enough to withstand normal hazards of storage and transportation. They shall be packed in such a way that they do not get bent or scratched by pressing against one another or against the walls of the box.

7 MARKING

7.1 The box containing spindles shall be marked with the following:

- a) Name of the material,
- b) Manufacturer's name and trade-mark,
- c) Lift of spindles,
- d) Taper of spindles,

e) Batch or code number, and

f) Number of spindles in a box.

7.2 Each box may also be marked with the Standard Mark.

8 SAMPLING

8.1 In a consignment, all aluminium plug spindles of the same type and dimensions shall be grouped to constitute a lot. Sampling shall be done from each lot.

8.2 For the characteristics of workmanship and finish, dimensions, trueness of spindles and buttons, sampling and criteria for conformity shall be in accordance with IS 2500 (Part 1) : 1973 at inspection level 3 and AQL 1.0 percent.

8.3 For hardness of blade, samples shall be selected at random and tested at the rate of 1 per 100 spindles of the lot subject to a minimum 2 and maximum 10 tests. There should be no failure if the lot is to be accepted under this clause.

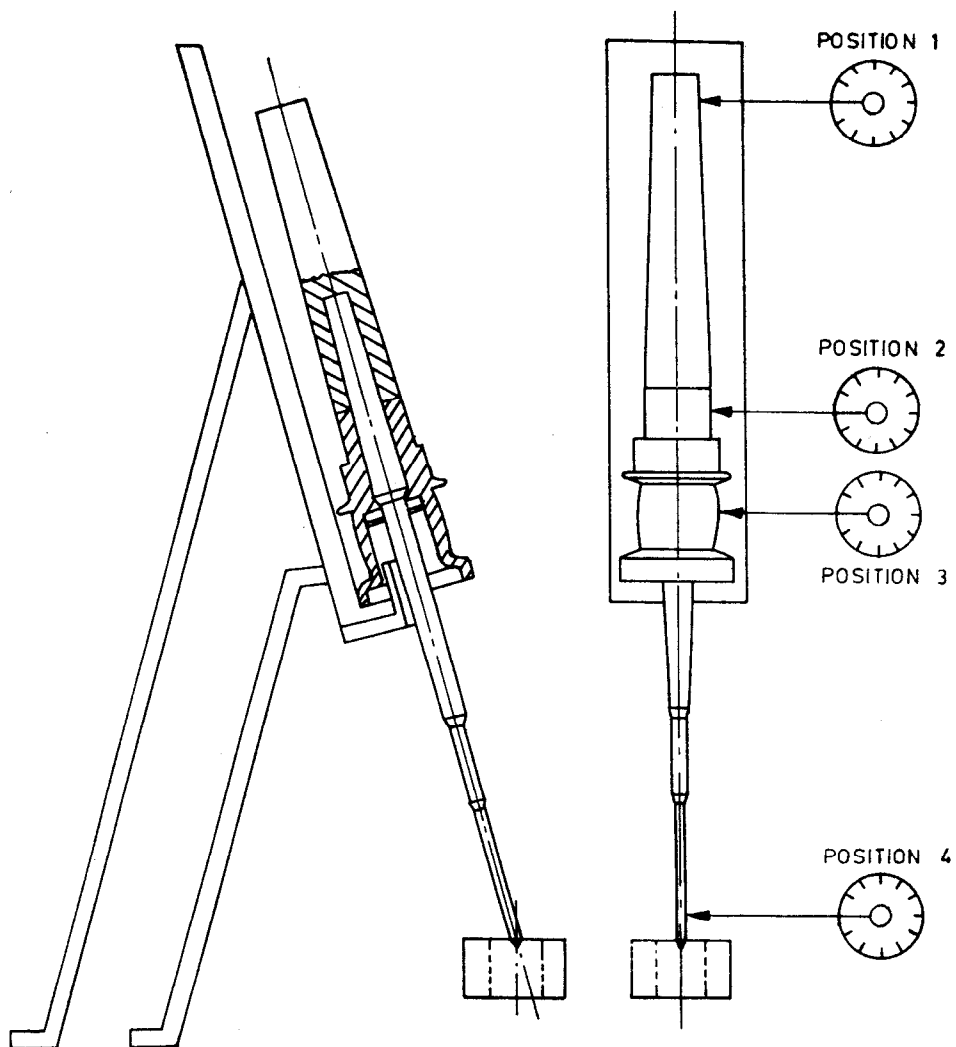


FIG. 2 ASSEMBLY FOR THE TESTING OF TRUENESS OF SPINDLE

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